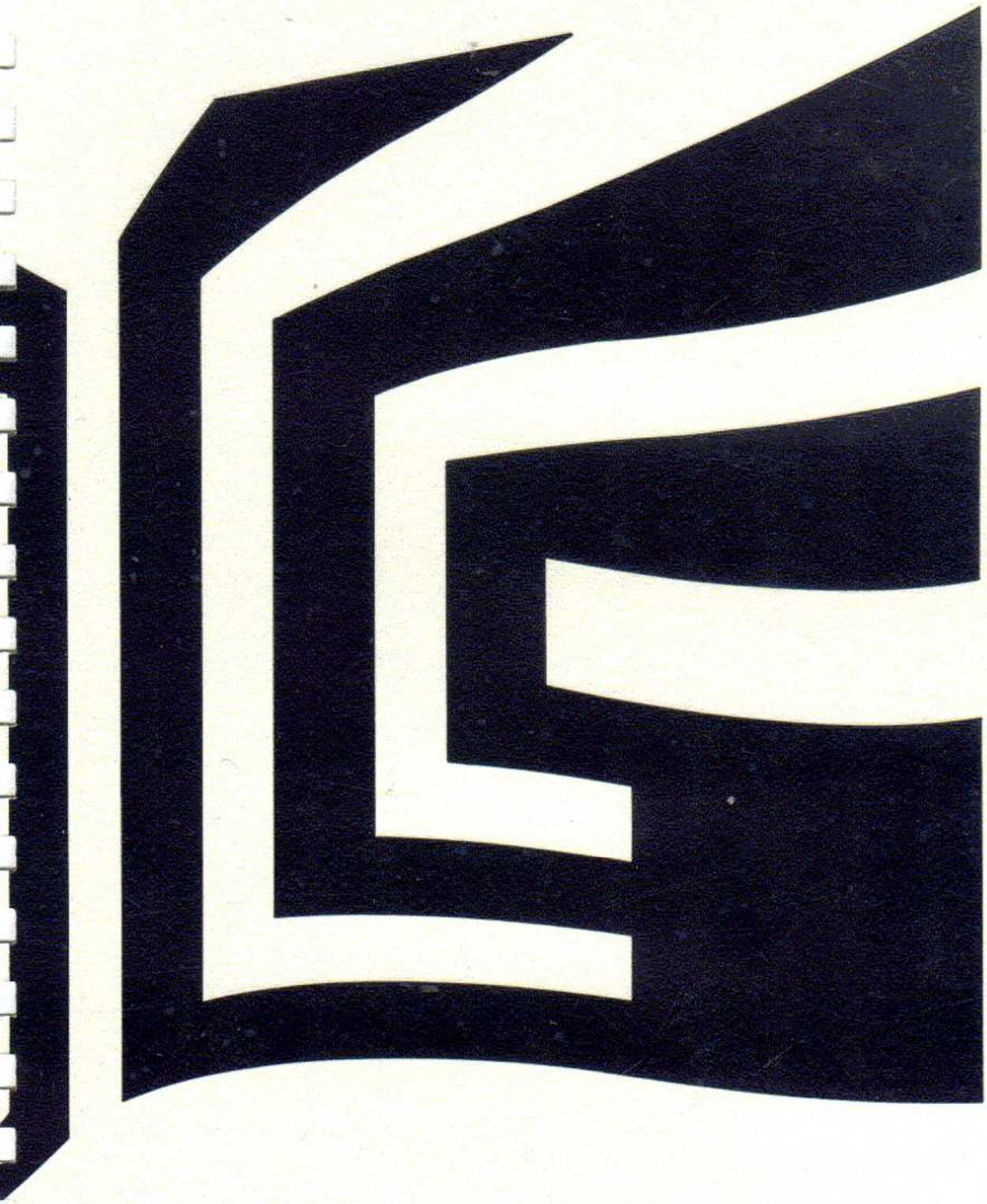
LONDON 16



INSTALLATION MANUAL

National
Telephone
Systems

LONDON 16
TELEPHONE SYSTEM
INSTALLATION MANUAL

Issue L16CH/IM/1.3
National Telephone Systems

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Table of Contents

1. INTRODUCTION 1

1. 1. Configurations 1
1. 2. Tools and test equipment 2
1. 3. Site requirements 2
Figure 1: POWER PROTECTIVE EARTH ARRANGEMENT 3

2. INSTALLATION INSTRUCTIONS 4

2. 1. General 4
2. 2. Outside line and extension interface cards 4
Figure 2: SETTING DIALLING MODE ON OUTSIDE LINE CARD 5
Figure 3: SYSTEM LAYOUT 6
2. 3. Wall mounting 7
Figure 4: ORIENTATION OF WALL-MOUNTING PLATE 7
2. 4. Extension and exchange line wiring 8
Figure 5: TJF LAYOUT 8

3. METER PULSE DETECTION 10

Figure 6: O/L CARD WITH METER PULSE DETECTION 10
Figure 7: LOCATION OF EARTH TERMINALS 11
Figure 8: EARTHING ARRANGEMENT FOR METER PULSE DETECTION 12

4. VISUAL INSPECTION AND PRE-CONNECTION POWER-UP CHECK 13

Figure 9: BATTERY LINK 13

5. COMMISSIONING CHECKS 14

6. CALL LOGGING PRINTER PORT 15

Table 1: CODES FOR SETTING PRINTER BAUD RATE 15

7. AUXILIARY PORT 16

Figure 10: LOCATION OF AUXILIARY PORT 16

1. INTRODUCTION

The London 16 must be installed in compliance *either* with Parts 1 and 2 of British Standard 6701 (1986); *or* with the DTI Interim code of Practice for the Installation of PABXs (August 1983); *or* with British Standard 6506 (1984).

1.1. Configurations

The London 16 telephone system has a total of 16 ports; it may have up to eight outside lines, giving the following possible configurations (outside lines + extensions):

0 + up to 16
1 + up to 15
2 + up to 14
3 + up to 13
4 + up to 12
5 + up to 11
6 + up to 10
7 + up to 9
8 + up to 8

These configurations are achieved by installing the appropriate number of interface cards onto the motherboard (one circuit per card).

The telephone instruments to be used on the London 16 may be either *MF4* (multi-frequency) or *loop disconnect* (pulse).

MF telephones must have *timed break recall.* MF decoders are fitted as standard on the London 16.

Signalling on outside lines may be either MF or loop disconnect.

An RS232C/V24 printer interface is fitted as standard.

1.2. Tools and test equipment

Item	Quantity
Antistatic wriststrap	1
Terminal screwdriver	1
Small adjustable spanner	1

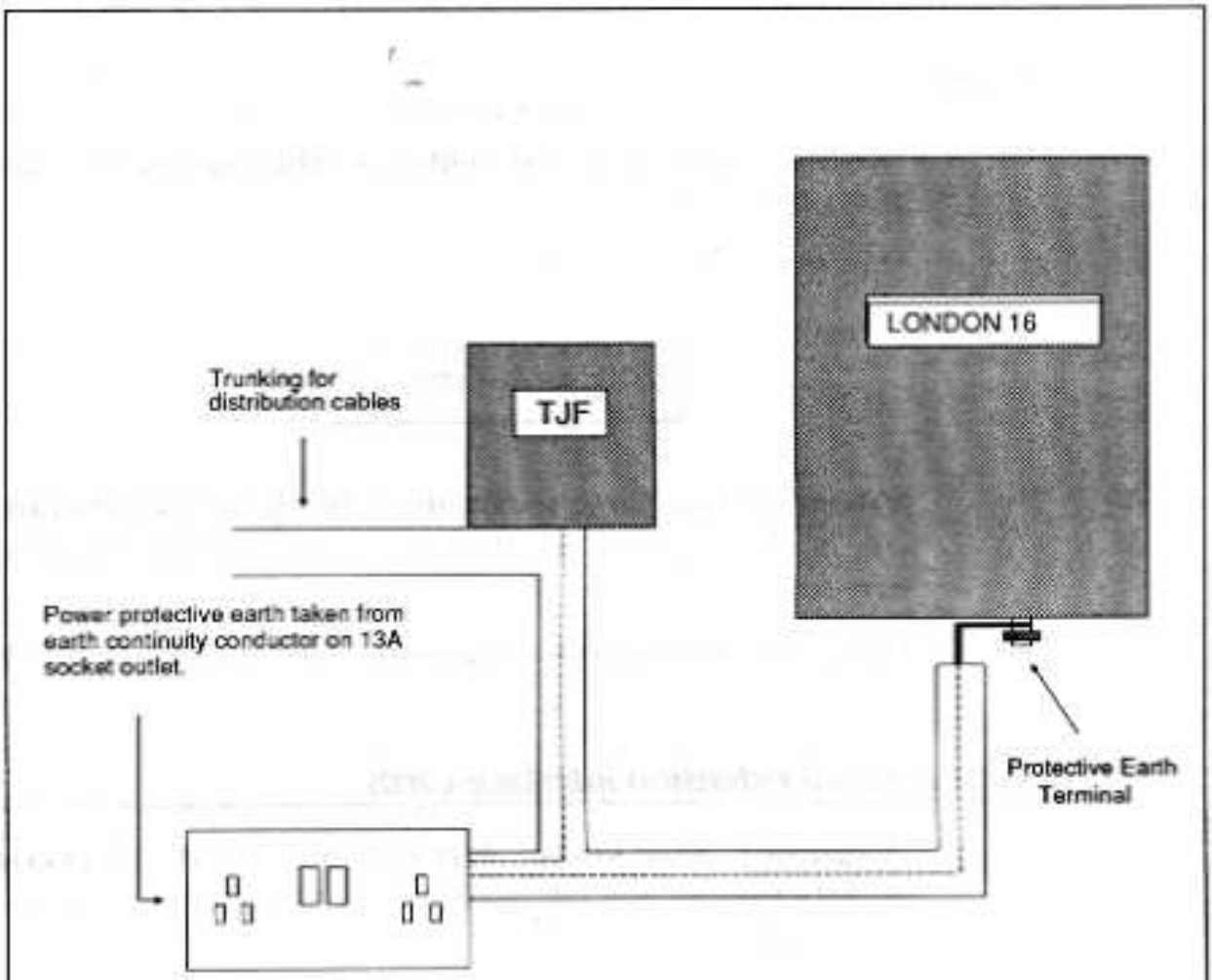
1.3. Site requirements

The London 16 is designed to work in a normal office environment. The unit should be sited with ease of access in mind, and should be away from:

- Hazardous areas
- Processes producing electricity, fumes, dust, gasses or radiation (e.g. silicon or halon contamination from photo-copying or fire protection equipment)
- Electrical meters or switchgear
- Fire sprinkler systems
- Water pipes
- Gas meters, pipes or appliances
- Dampness
- Vibration

The unit should be installed at a convenient working height in a well lit room. The room should be one which is normally supervised, or to which access is restricted.

Figure 1: POWER PROTECTIVE EARTH ARRANGEMENT


LONDON 16
TJF
Trunking for distribution cables
Power protective earth taken from earth continuity conductor on 13A socket outlet.
Protective Earth Terminal

Notes

Earth wires to be minimum 2.5 sq.mm, enclosed in capping, trunking or some form of mechanical protection.

Socket outlet should be surface mounted so that the earth cables enter through a designated cable "knock-out". Flush mounted sockets may be raised from the wall using a mounting frame (MK part number MK 2133 WH1).

Separate earth wires should be run to the "Protective Earth" terminal on the CCU chassis and to the earth post in the TJF.

2. INSTALLATION INSTRUCTIONS

2.1. General

The unit is wall mounted, within 2 cable metres of a suitable mains outlet.

The socket should be labelled:

TELEPHONE EQUIPMENT
DO NOT DISCONNECT

Whenever possible, the customer should be asked to provide a "clean" power supply direct from the power distribution board.

Figure 1 shows the power protective earthing arrangement.

2.2. Outside line and extension interface cards

WARNING: ANTI-STATIC PRECAUTIONS MUST BE TAKEN WHEN WORKING ON OR NEAR THE UNIT OR ANY OF ITS COMPONENTS.

1. Remove the case lid by undoing the screws at the base of the unit.
2. Check that all the molex/ribbon connectors are correctly inserted.
3. Ensure that the outside line (O/L) interface cards have been set for the correct dialling mode (MF or loop disconnect). This is achieved by changing the position of the Molex link on the O/L interface card as shown in Figures 2a and b. It is factory set for loop disconnect dialling.
4. Insert the required number of interface cards into the slots provided, in their correct positions (see Figure 3).

Figure 2: SETTING DIALLING MODE ON OUTSIDE LINE CARD

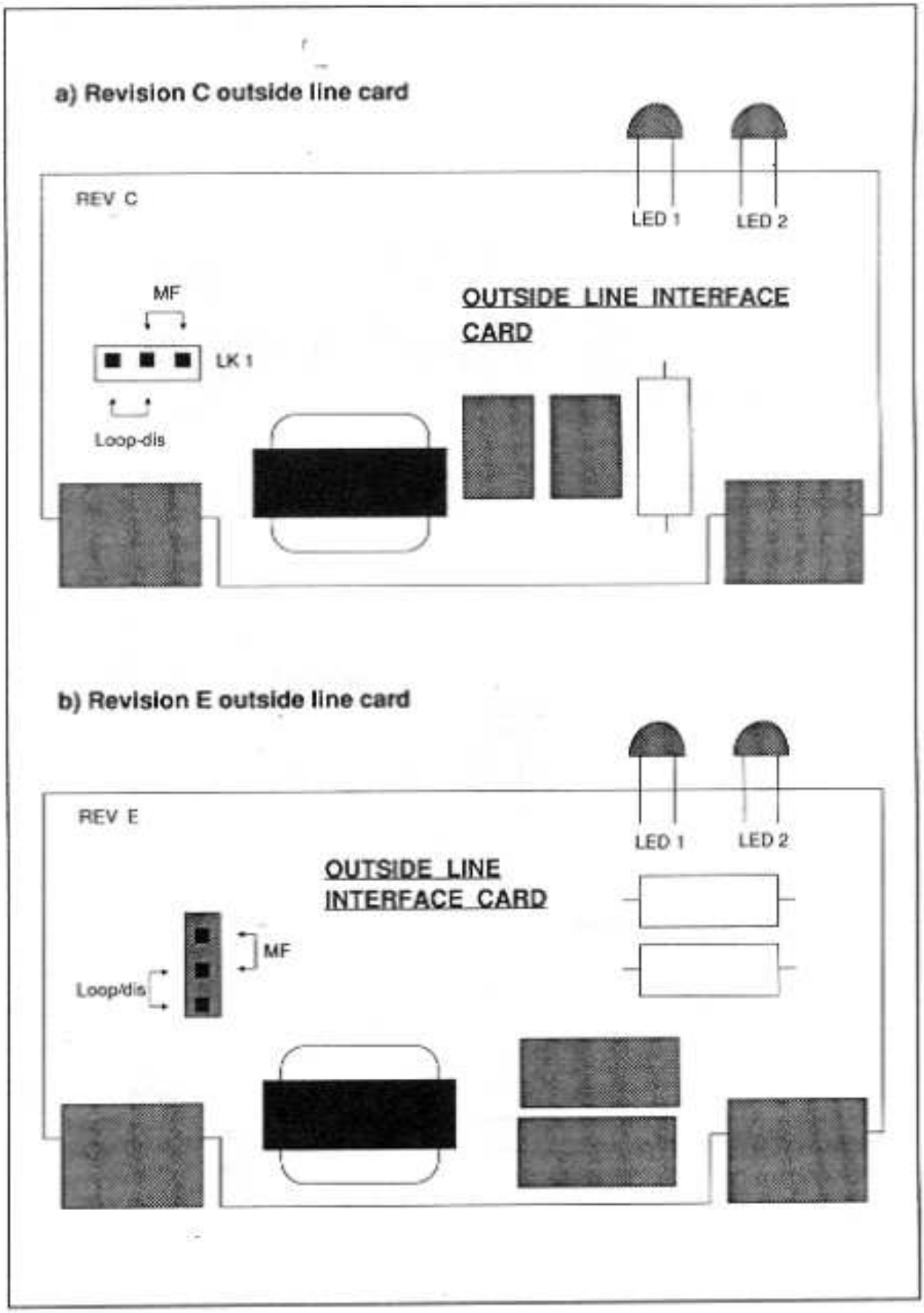
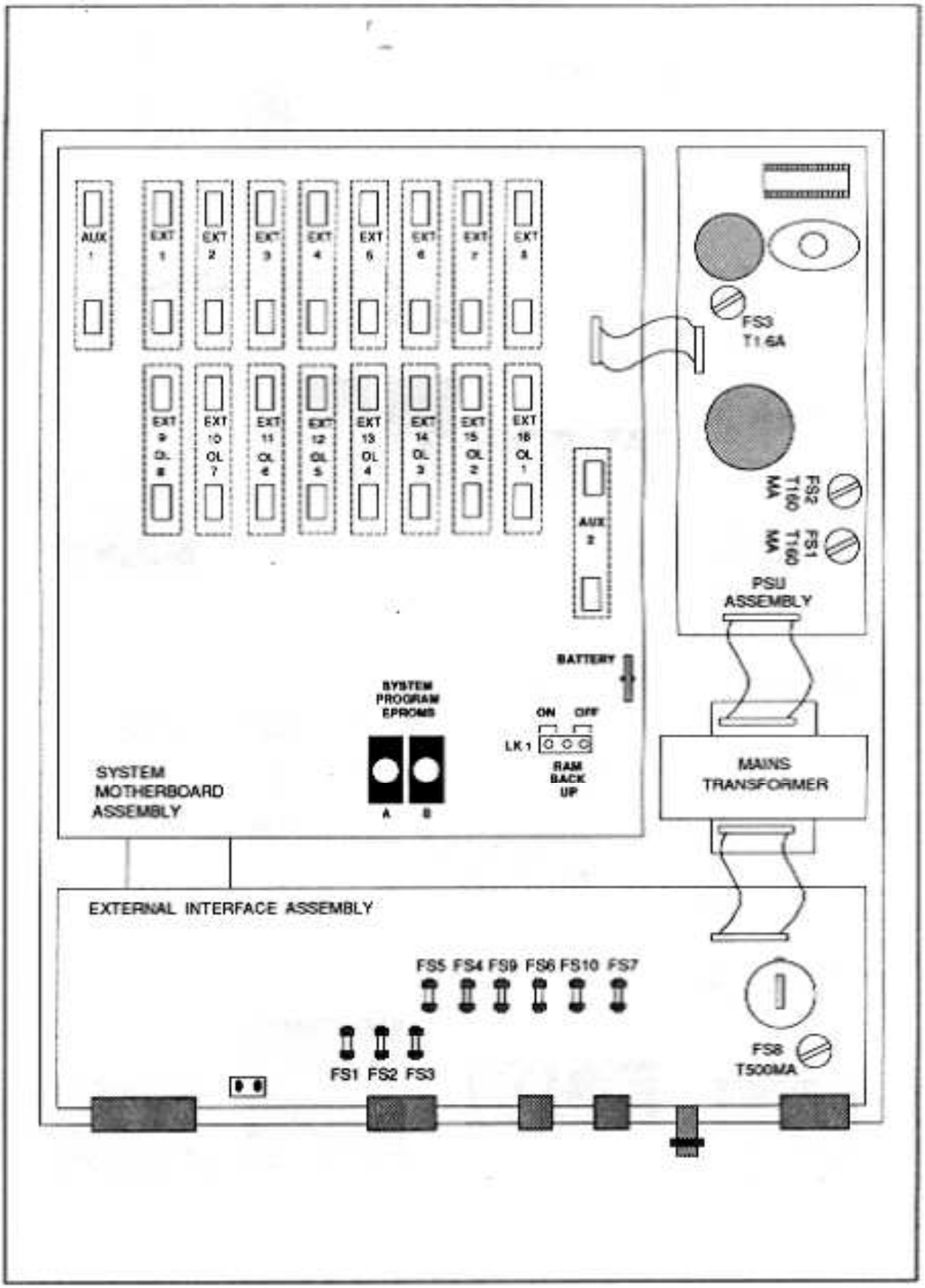


Figure 3: SYSTEM LAYOUT

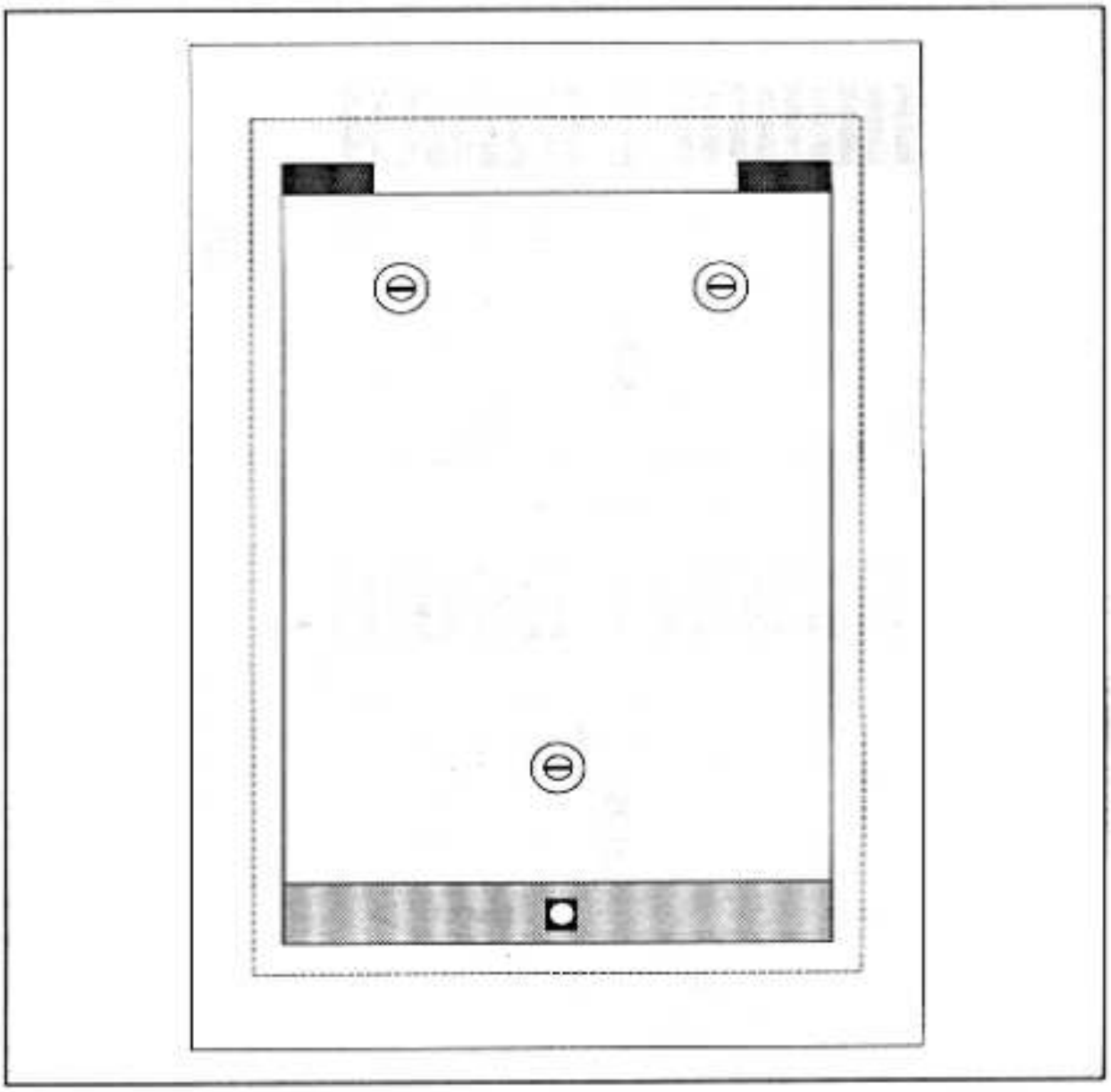


2.3. *Wall mounting*

To wall mount the central control unit, proceed as follows:

1. Attach the mounting bracket to the wall as shown in Figure 4.
2. Locate the unit so that the lip of the mounting bracket fits into the slot provided in the back plate.
3. Fix the unit to the bracket by inserting the screw provided through the "keyhole" on the back plate.

Figure 4: ORIENTATION OF WALL-MOUNTING PLATE



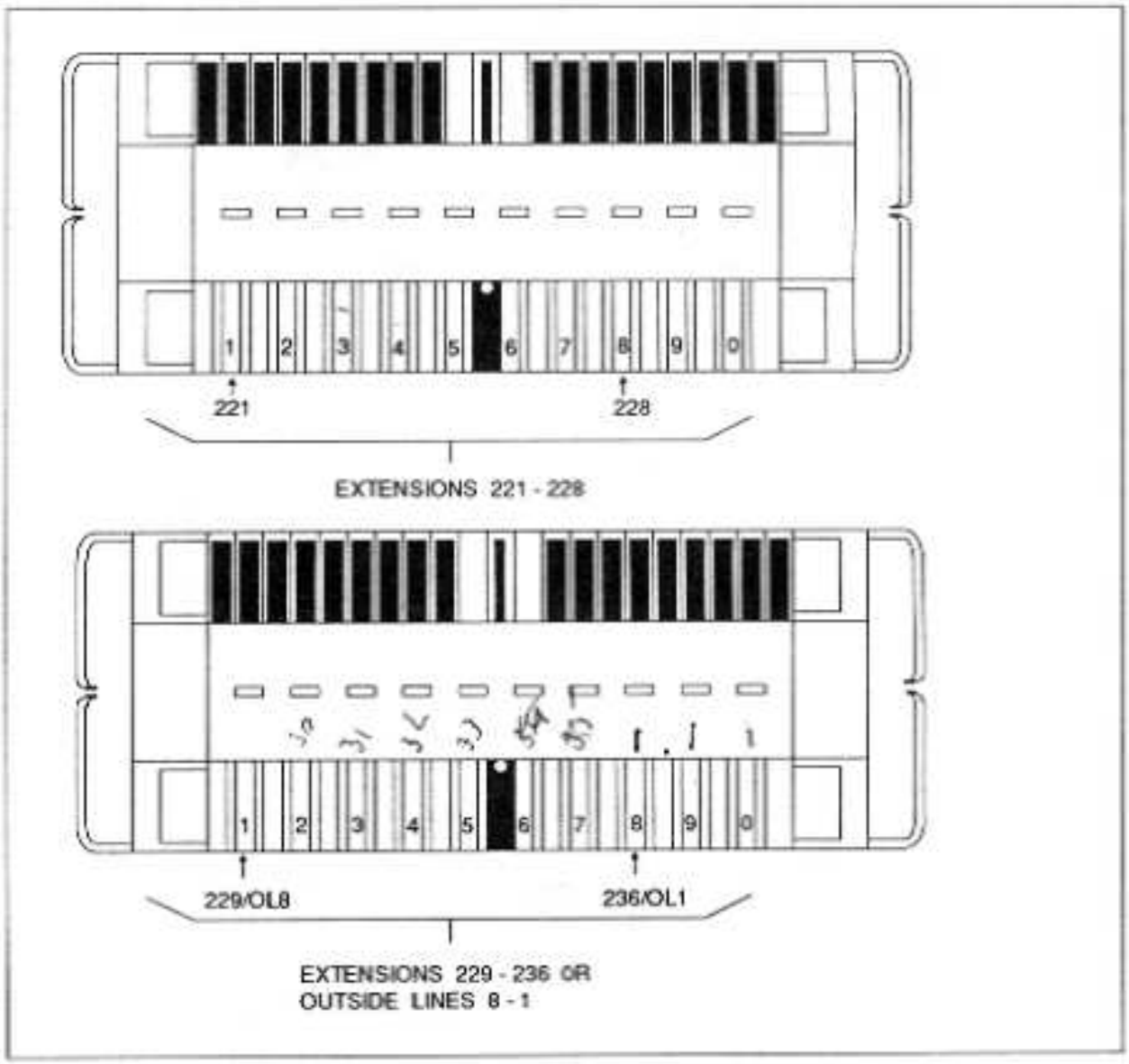
2.4. Extension and exchange line wiring

Extensions are wired in a 2-wire star configuration with telephones connected via master jacks 1M/1

Extensions are connected to the TJF in a standard format, starting with extension 221 (see Figure 5).

Connection of PSTN lines to the London 16 may be carried out by British Telecom personnel only. The network test and termination point is the bottom Krone strip of the TJF.

Figure 5: TJF LAYOUT



Off-premises extensions may be provided on the London 16. The following rules will apply:

i. For extensions not more than 200 metres beyond the curtilage of the customer's premises, the wiring must be directly routed, i.e., not with PSTN circuits; and not more than four spans of overhead cable must be used.

ii. For extensions beyond the 200-metre limit, the line between the London 16 and the distant extension must be a low-loss access line, and the lines between the local public exchange and the London 16 must be 3dB or 6dB low-loss exchange lines. The transmission loss between the local public exchange and the distant extension must not exceed 10dB.

The system control unit to extension line loop resistance must not exceed 196 ohms (1 km of 0.5 mm copper cable). Extension wiring can be internal or external to the building, up to the extension line signalling limit of 196 ohms.

The length of external line that can be installed without overvoltage protection should be agreed with the local BT office.

Where overvoltage protection is required, this should be achieved by fitting surge arrestors type BT 18A in the MDF on the relevant extension pairs.

3. METER PULSE DETECTION

For lines on which meter pulse detection is required, metered outside line cards (see Figure 6) should be installed.

When a metered outside line card is installed, then a signalling earth must be provided in addition to the power protective earth (see Figures 1 and 8).

This signalling earth is terminated on the system earth terminal on the external interface card (see Figure 7). The earth cable can be brought into the unit via the designated entry hole on the left hand side of the unit.

Figure 6: O/L CARD WITH METER PULSE DETECTION

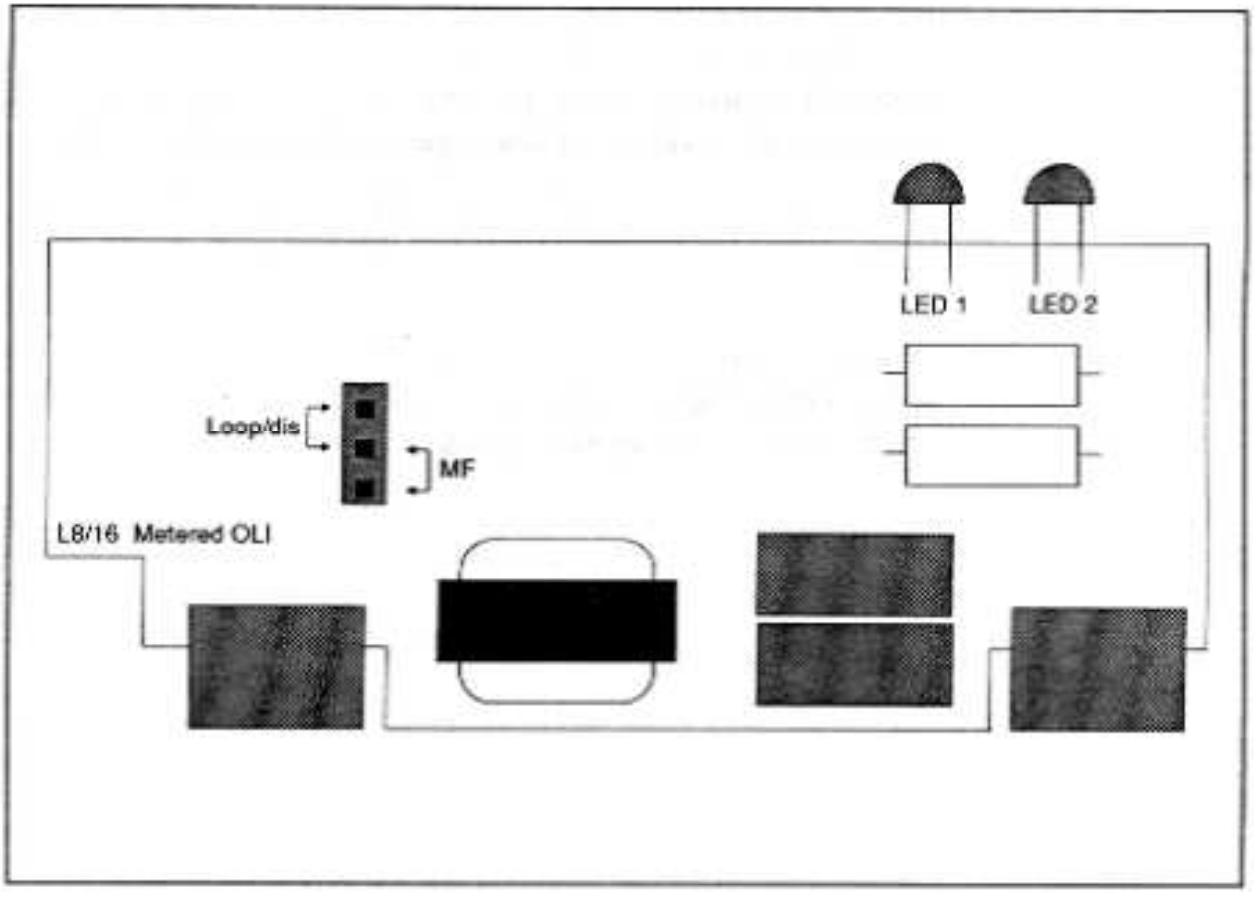


Figure 7: LOCATION OF EARTH TERMINALS

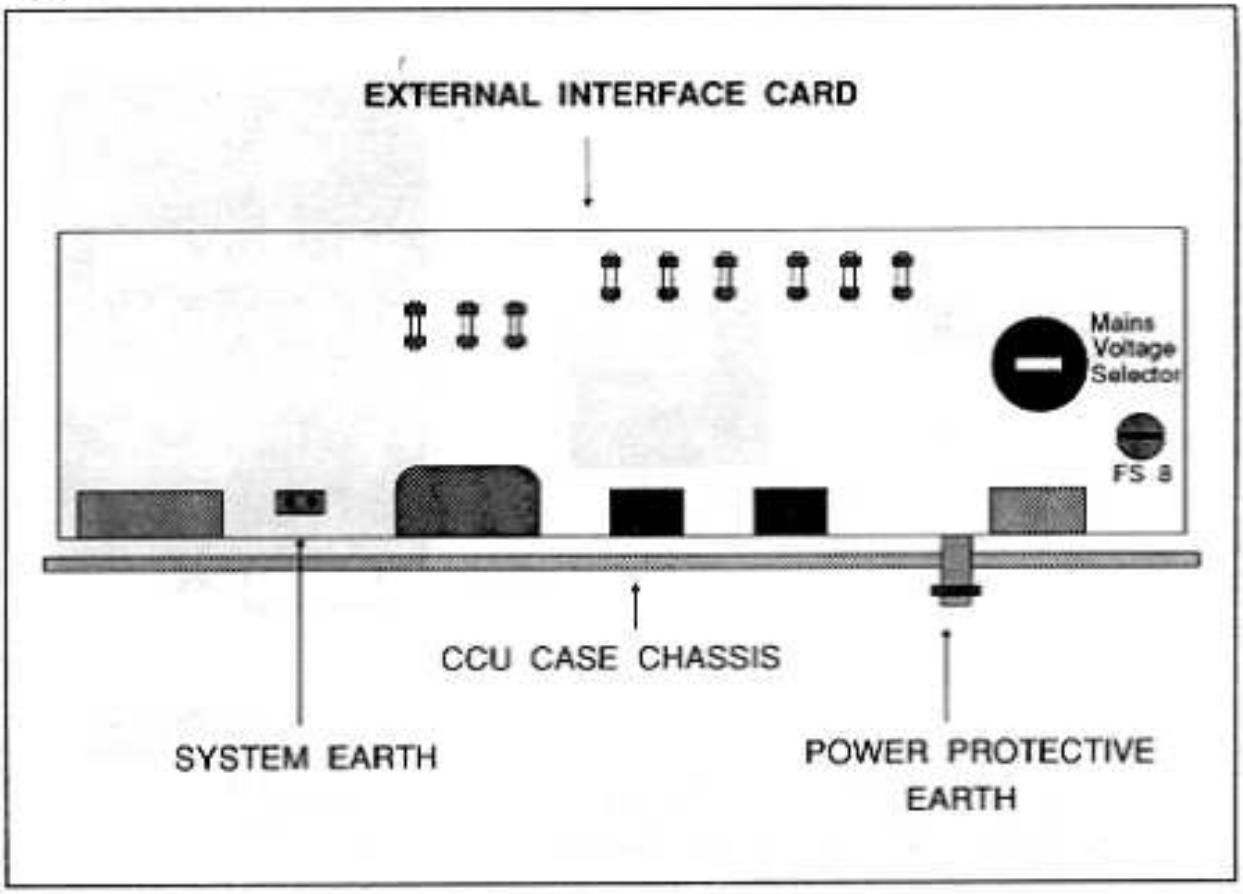
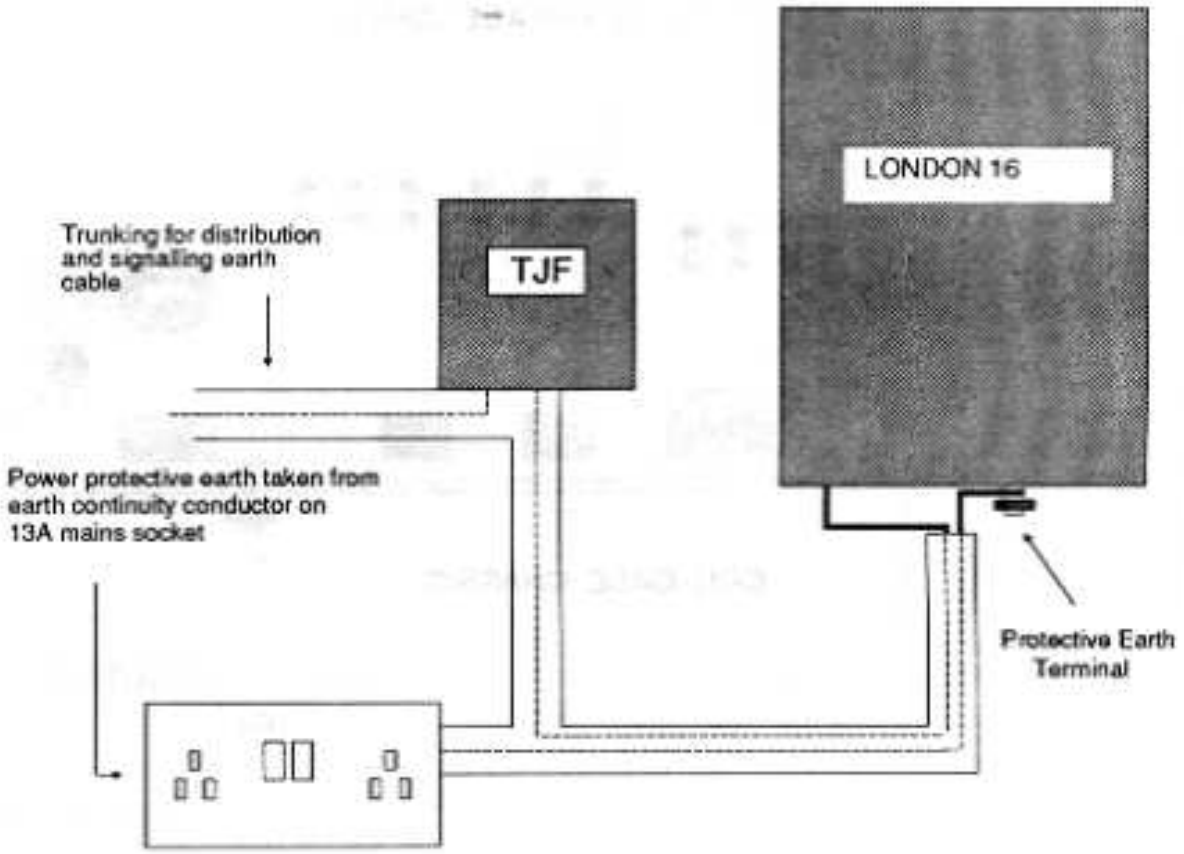


Figure 8: EARTHING ARRANGEMENT FOR METER PULSE DETECTION


LONDON 16
TJF
Trunking for distribution and signalling earth cable
Power protective earth taken from earth continuity conductor on 13A mains socket
Protective Earth Terminal

Notes

Earth wires to be minimum 2.5 sq.mm, enclosed in capping, trunking or some form of mechanical protection (mechanical protection is not mandatory for signalling earth).

Socket outlet should be surface mounted so that the earth cables enter through a designated cable "Knock-out". Flush mounted sockets may be raised from the wall using a mounting frame (MK part number MK 2133 WH1).

The power protective earth is terminated on the "Protective Earth" terminal on the base of the CCU.

The signalling earth must be derived from the main building earth point or a buried electrode. mains earth must *not* be used.

The signalling earth should be run via the TJF earth post to the "System Earth" terminal (TER 1) on the external interface card.

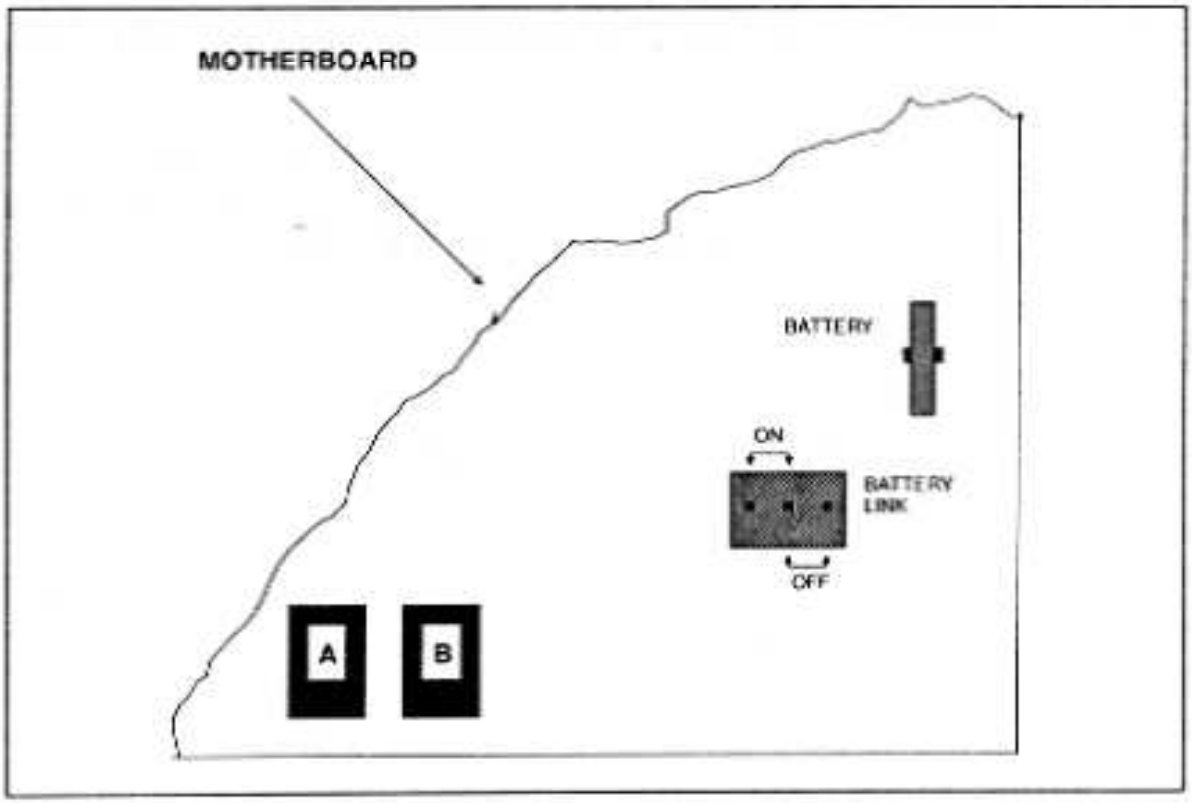
4. VISUAL INSPECTION AND PRE-CONNECTION POWER-UP CHECK

1. Ensure that the mains voltage selector is set correctly (240 V in UK).
2. Ensure that the mains input fuse FS8 is of the correct value, as follows:

500 mA	SloBlo 250 V for 240 V mains
500 mA	SloBlo 250 V for 220 V mains
1 A	SloBlo 250 V for 110 V mains

3. Ensure that the Molex link covers the two pins for the RAM battery back-up at the lower right hand side of the motherboard *(see Figure 9)*.
4. Check that the interface cards are securely installed and that the Molex links on the outside line cards are set for the correct type of signalling.
5. Ensure that there is a 3-Amp fuse installed in the 13-Amp mains plug.

Figure 9: BATTERY LINK



5. COMMISSIONING CHECKS

Power up the London 16 and carry out the following checks:

1. On each extension, check:
   Internal dial tone
   Dialling
   Ringing

2. Seize each outside line circuit in turn, by dialling **81** for the first circuit, **82** for the second, etc., and check that the Line Seized LED operates.

3. Check the battery back-up as follows:

   Set up a call diversion from extension 221 to extension 222 by dialling **604 222** from extension 221. Check that calls are diverted by making an internal call to extension 221; extension 222 should ring with *Internal Call* cadence.

   Switch off the mains power, leave for 1 minute and switch back on.

   Check that calls are still diverted from extension 221 to extension 222.

   Cancel the diversion by dialling **605** from extension 221.

4. If an exchange line simulator is available, set up an incoming call on each outside line and check that extension 221 rings for each line.

6. CALL LOGGING PRINTER PORT

An RS232C interface (via a 25-pin D-type connector) is situated on the bottom of the unit, to allow connection of a printer or terminal. This interface uses the following signal lines:

Pin 3 ---- Transmit data
Pin 7 ---- Signal ground
Pin 20 --- Data terminal ready

Note: *Some printers may require other pins to be strapped together*

The printer port incorporates a fuse disconnection barrier to enable the connection of any compatible printer or terminal. Note that current loop printers should not be used.

Data is transmitted as 7 data bits, one stop bit and with even parity. The data transmission speed is selectable between 300 and 9600 Baud using the programming commands shown in *Table 1*.

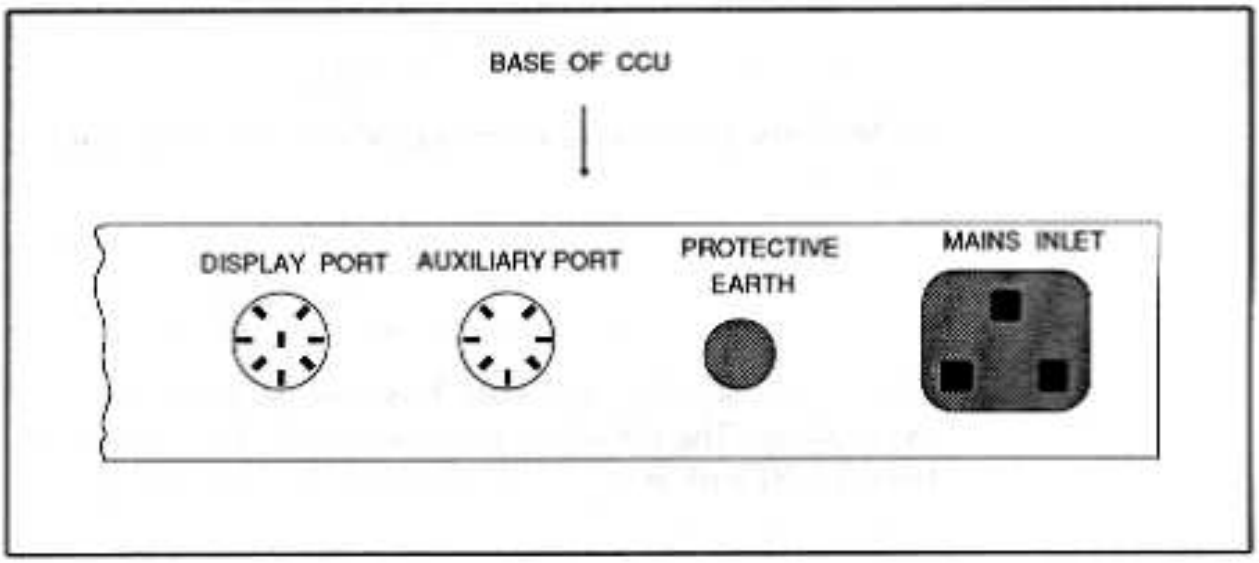
Table 1: CODES FOR SETTING PRINTER BAUD RATE

Baud rate	Code
9600	19680
4800	19681
2400	19682
1200	19683
600	19684
300	19685

7. AUXILIARY PORT

There is a 7-way DIN socket on the bottom of the unit (see Figure 10), to provide for connection of external features associated with the options card.

Figure 10: LOCATION OF AUXILIARY PORT



8. ATTACHMENTS

In the UK, attachments that have extension port approval (BS6301) may be connected to the London 16. Examples are extension bells, callmakers, telephone answering machines, modems, etc.

The number of bells/sounders which may be handled by the system is governed by the following:

The sum of the REN numbers of telephones and attachments connected to a single extension port must not exceed 3.

The sum of the REN numbers of all telephones and attachments connected to the London 16 must not exceed 30.

9. SYSTEM PROGRAMMING

Refer to the *London 16 Programming Manual* for instructions on programming the system. Certain programming operations are, however, normally carried out only by the installer; these are described below.

9.1. The master phone

Most of the system programming codes can only be dialled from an extension which has been designated the *master phone*. When the London 16 is installed, extension 221 is the master phone. However, any extension on the system may be made the master phone.

If the customer has requested that an extension, XXX, other than extension 221 should be the master phone, program this by dialling on extension 221:

☞ **1966 XXX**

Carry out system programming according to the customer's requirements. At the back of the *London 16 Programming Manual* is a checklist which you can run through with the customer.

A copy of the programmed information printout should be left with the system.

First, set the correct time and date.

9.2. Configurable timeouts

Certain timeout values on the London 16 are configurable, and can be changed from the master phone using the programming codes shown in *Table 2*. Since operational problems can occur if these values are changed without careful consideration, it is strongly recommended that only authorised engineers should use the programming codes associated with timeouts.

Table 2: PROGRAMMING CONFIGURABLE TIMEOUTS

Timeout	Code	Default (sec)
Camp-on busy return	1911XXX	045
Unanswered call return	1912xxx	030
Parked call return	1913xxx	010
Unanswered alarm call	1914xxx	240
Unanswered ringback	1915xxx	015
DSA busy	1916xxx	020

xxx = time in seconds (001–250)

Camp-on busy return — The time after which calls camped on to a busy extension by a reception phone will be returned to the reception phone(s) if the required extension does not become free.

Unanswered call return — The time after which a call transferred from a reception phone will be returned to the reception phone(s) if the required extension does not answer.

Parked call return — If an extension which has parked a call is unused, the call will return after this period of time.

Unanswered alarm call — The time for which an unanswered alarm call will continue to ring an extension. If an intruder alert alarm is fitted, and has been triggered, this is also the time for which unanswered phones will ring after one phone has been picked up (see the *Programming Manual* for details).

Unanswered ringback — The time for which an unanswered ringback will continue, indicating that a requested extension or outside line has become free.

DSA busy — The time after which a trunk in DSA mode will clear down if the host extension being called is busy.

If a printer is connected to the London 16, check the programmed information by dialling 1951 from the master phone. Timeouts may be printed by dialling 1954 from the master phone.

9.3. "Busying-out" selected lines

If the system is being checked for a possible outside line fault you can "busy out" selected lines using the following programming codes:

☞ **1931 N** Outside line to be ignored for outgoing calls

☞ **1932 N** Outside line to be re-instated

where N = line number (1 to 8)

9.4. Additional programming codes

The following two master phone programming codes may be required in certain exceptional circumstances. In any case, they should be used only by the installer or authorised maintainer. Inappropriate use of these codes could cause operational problems.

Change ring bridging

The default ring bridging, i.e. the time between the last ringing pulse received from the sender and the London 16 ceasing to ring, is *2 seconds*. To change this, dial:

☞ **1735 tt**

where tt = time in seconds from 00 to 30.

This may be useful where the London 16 is installed as a subsidiary to a manual exchange which does not send ringing pulses automatically.

Deferred dialling

The default delay between an outside line being seized and any dialled digits being sent to that line is *1 second*. To change this, dial:

☞ **1734 t**

where t = time in seconds from 1 to 56

This may be useful: *(i)* where extension users are getting round call barring due to the slowness of the local public network; *(ii)* when the London 16 is installed as a subsidiary to another system.

Outside line re-use

After an incoming call, there is a delay before the line involved can be selected for an outgoing call. The default delay is 10 seconds. To change this:

☞ **Dial 1737 ss**

where ss is the time in seconds from 05 to 16.

10. SITE DOCUMENTATION AND LABELS

In the UK, the following documentation should be left on site before connection of the London 16 to the PSTN by British Telecom:

10.1. Documents

- Private Exchange Master List (PXML 120)
- *Programming Manual* and *User Guides* as supplied in the London 16 document pack
- Copy of a maintenance contract signed by the customer

10.2. Labels

- "999" labels attached to each telephone
- Label on each socket:

WARNING. CONNECT ONLY APPARATUS COMPLYING WITH BS6301 TO THIS PORT

11. INSTALLATION AND CONFIGURATION RECORD

To be filled in by the installer and left on site. It is important that this record should be updated if the system configuration is changed in any way.

Customer: _____

Site address: _____

_____

_____

Installer: _____

Installation engineer: _____

Installation date: _____

Serial number: _____

Hardware confiiguration ***Serial number***

Slot 1 EL card (Ext 221) _____

Slot 2 EL card (Ext 222) _____

Slot 3 EL card (Ext 223) _____

Slot 4 EL card (Ext 224) _____

Slot 5 EL card (Ext 225) _____

Slot 6 EL card (Ext 226) _____

Slot 7 EL card (Ext 227) _____

Slot 8 EL card (Ext 228) _____

Slot 9 OL card (OL 8) _____

EL card (Ext 229) _____

Slot 10 OL card (OL 7) _____

EL card (Ext 230) _____

Slot 9 OL card (OL 6) _____

EL card (Ext 231) _____

Slot 9 OL card (OL 5) _____

EL card (Ext 232) _____

Slot 9 OL card (OL 4) _____

EL card (Ext 233) _____

Slot 9 OL card (OL 3) _____

EL card (Ext 234) _____

Slot 9 OL card (OL 2) _____

EL card (Ext 235) _____

Slot 9 OL card (OL 1) _____

EL card (Ext 236) _____

Exchange lines

Line 1 tel. no: _____ Power fail extension 221

Line 2 tel. no: _____ Power fail extension 222

Line 3 tel. no: _____ Power fail extension 223

Line 4 tel. no: _____ Power fail extension 224

Line 5 tel. no: _____ N/A

Line 6 tel. no: _____ N/A

Line 7 tel. no: _____ N/A

Line 8 tel. no: _____ N/A